COURSE SYLLABUS
ORDINARY DIFFERENTIAL EQUATIONS • SPRING 2020 • MATH 211.S02

SIRAN LI

Lecture Information: MWF 11:00–11:50am, Dell Butcher Hall (DBH) 180.

Course Description: Differential equations arise naturally from many different settings in natural and social sciences. For example, the motion of fluids, the evolution of geometric shapes, the growth of bacteria, the variation of stock price, and the classical/quantum harmonic oscillators, etc. etc., can all be modelled by differential equations. In this course we focus on ordinary differential equations (ODE in brevity). That is, we analyse the solution $y = y(t)$ for equations of the form $G(t, y'(t), y''(t), \ldots) = 0$, where G is a known function, and subject to suitable initial conditions. Throughout the computational and applied aspects shall be emphasised.

Course Outline: Review on differentiation. First-order ODEs. The Picard–Lindelöff theorem. Rudiments of linear algebra. Higher-order linear ODEs. Systems of linear ODEs. Systems of nonlinear ODEs. Stability of equilibria for simple dynamical systems. The Laplace transform.

Text: Farlow, Hall, McDill, and West, *Differential Equations & Linear Algebra*, Pearson, 2007.

Assessment: Weekly written problem sheets (20%), two midterms, and one final exam. A unified curving scheme will be implemented in a course-wide manner (*i.e.*, not just for this section) for the determination of the letter grade for the course. Your exam scores, which constitute 80% of your course grade, are computed via maximising the following three options:

- 25% Midterm I, 25% Midterm II, 30% Final;
- 20% Midterm I, 25% Midterm II, 35% Final;
- 25% Midterm I, 20% Midterm II, 35% Final.

The midterms are scheduled on **11 February, Tuesday** and **31 March, Tuesday**, both from 7 to 9pm. The date for the final is not available at this time. It is the policy of the Mathematics Department that no final may be given early to accommodate student travel plans. If you make travel plans that later turn out to conflict with the scheduled exam, then it is your responsibility to either reschedule your travel plans or take a zero in the final. Books, notes, and calculators will not be allowed on exams. If an exam conflicts with a holiday you observe, please let me know before the end of the second week of classes.

Problem sheets are due **at the beginning of the Wednesday lectures** (starting from Week 3, 29 January). No late sheets will be accepted.

Office Hours: Monday and Wednesday 4–5pm in my office (Herman Brown Hall 452), or by appointment via email <Siran.Li@rice.edu>.

Teaching Assistance: Undergraduate TAs will mark the weekly problem sheets. Also, there is a calculus help room organised by graduate TAs weekly (time and location announced later). Students are strongly encouraged to talk to the graduate TAs during the help room.

Disability support. Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All such discussions will remain as confidential as possible. Students with disabilities will need to also contact Disability Support Services in the Allen Centre.